**Amendments to the Drawings:**

The attached sheets of drawings include proposed changes to Figs 4 and 5. The attached sheets would replace the original sheets 4 and 5. Reference numeral **79** has been added to both figures consistent with the changes made to the specification as shown on page 2 of this paper. Fig. 5 previously omitted elements **79** in broken lines have also been added. These sheets were previously submitted.

Attachment: Annotated Sheets 4 and 5 Showing Changes.

**REMARKS**

Applicant is filing this response to answer the outstanding Office Action. Applicant has used the revised amendment format as best understood by his attorney. Applicant respectfully requests reconsideration of the instant application. Entry of the above amendments and following comments is respectfully requested before such reconsideration.

Examiner has objected to the drawings under 37 CFR 1.83(a), specifically addressing the feature of the hub perimeter fitted within each disc central radial opening and having a plurality of apertures formed therein. Applicant has further modified Figure 4 to show the feature and adding a reference numeral to clearly indicate the feature. The Specification was previously amended to include the reference numeral.

Claims 1-5 have previously been cancelled. Claims 6-13 are pending in the application.

Examiner has rejected claims 6-13 under 35 U.S.C. 112, second paragraph, pointing out several problems with claim 6. Applicant has corrected these problems with a number of amendments. Examiner also indicated concern with claim 12. However, Applicant respectfully points out in claim 6, lines 7-8, proper antecedent basis for "said disc porous material".

Examiner has rejected claim 6 under 35 U.S.C. 103(a) as being unpatentable over Yuichi et al in view of Okada, McKay, SU 591,203, JA 181,503, and Tuit. Examiner has rejected claims 7-9 under 35 U.S.C. 103(a) further in view of Hedges et al. Examiner has rejected claim 10 further in view of Miller, Jr. Examiner has rejected claims 11 and 12 further in view of Ahlberg, Jr., et al. Examiner has rejected claim 12 further in view of Geldmacher. Applicant acknowledges the Examiner's rejections under 35 U.S.C. 103(a) and respectfully traverses upon the following reasoning.

The key component of the present invention is the method by which the liquid phase of the slurry is being driven out of the product, effectively, the "liquid-solid" separation taking place within the filter vessel (30). Whereas, all other known technologies use liquid pressure to squeeze the fluid through porous membranes, the present invention uses vacuum. The present

invention discs have hollow interiors which communicate with the hollow shaft of the invention. The vacuum is being pulled by an external vacuum pump which draws the fluid through the porous disc surfaces into the interior of the discs and then into the interior of the hollow shaft which leads to a filtrate tank (60). Only the liquid is being allowed to escape since the solids are too large for the openings provided by the porous disk surfaces.

The bulk of the separation work taking place within the present invention is being done by the high rotational speed of the filter disc assembly. The high rotational speed is a key component since it is responsible for creating the high shearing effect taking place between the surface of the filter disc and the surrounding slurry within the vessel. Effectively, the high rotational speed prevents the suspended solids in the slurry from building up on the surface of the filter disc.

The intent of the present invention is to remove as much liquid as possible from the input slurry to the point that the slurry is greatly thickened. The intent of the present invention is not to produce a "dry-solids" cake. The feed tank of the present invention is not a pressure vessel because it is only used as a holding tank for the slurry. In some of the prior art

technologies, the feed tank must be a pressure rated vessel since it is integral to the "high pressure" circuit which is necessary for so many of the prior art technologies.

In the present invention the slurry is fed to the filter assembly vessel (38) via low pressure pump. Again, this pump need not be a high pressure pump since its only purpose is to introduce the slurry to the vessel (38). In the present invention this pump does not do any work relative to actual liquid-solid separation. This is in contrast with prior art technologies to which the present invention is being compared. In all of the other technologies, this pump is a most critical component since it must be a high pressure pump to force separation of the slurry through the filtration element.

The present invention slurry is being introduced at the bottom of the filter vessel (38) thereby allowing the slurry to overflow the top of the vessel. The overflow in turn is then re-directed back to the holding tank from which the feed was taken. Unlike the prior art technologies, the feed being introduced is not under high pressure, but rather is allowed to overflow and exit the vessel under gravity. The slurry is being introduced to the vessel at a constant feed rate with the intent of keeping the

filter vessel completely full at all times and thereby keeping the filter stack submerged within the slurry at all times. Since the feed is being introduced at a constant feed rate, these same solids are carried out of the filter vessel by the remaining liquid and back to the holding tank. Effectively, the slurry is continuously recycling from the holding tank, to the filter vessel where it is acted upon by the rotating discs, and back to the holding tank where the cycle commences again.

The technologies of the prior art, with one exception, use high pressure as the primary driving force for affecting the separation between the liquid and solid mixture.

The only prior art "vacuum" based design is that by McKay (3,245,536). However, McKay's method of operation is very different from the present invention. McKay discloses a well known technology in that the rotating disc dips into a pool of slurry while pulling a vacuum. These units rotate at a very slow rpm ranging down to 1/4 rpm or less. In the process, the filtrate is sucked through via internal vacuum pipes while the solids build up on the surface of the filter membrane. These solids are kept on this surface of the membrane as it rotates out of the pool. As the disc continues to rotate, the solids are scraped off of the

disc just prior to that same portion of the disc dipping back into the pool of slurry and thereby repeating the cycle. The present invention does not allow build-up on the disc surfaces but specifically prevent build-up.

Geldmacher (5,593,583) uses a similar technology. Geldmacher uses multiple disc inside a vessel. The vessel is completely filled with slurry, but the method of operation is similar to McKay. The disc rotate at a very slow rpm so as to allow the solids to build up on the surface of the disc, and then to be discharged at the end of its rotation by a complicated discharge system. Again, completely different from the present invention which is design specifically to prevent build-up of solids on disc surfaces.

Yuichi (5,110,463) is a high pressure based system. Yuichi has a rotating filtering cylinder/disc inside a vessel. Feed to the vessel is introduced by a high pressure nozzle which basically shoots a stream of slurry at the rotating cylinder. This allows a certain percentage of liquid to penetrate through the filtering cylinder filtrate, while the balance of the slurry flow is directed out of the vessel. the process of injecting this slurry at high pressure will cause build-up of solids on the surface of

the rotating cylinder. Yuichi then employs "ultrasonic waves" to "disperse" the solids from the surface of the cylinder and eventually out of the vessel. The driving force for the liquid/ slurry is by impact force driving the liquid through the filter medium. Applicant respectfully suggests that rather than causing a "shearing effect" the high pressure and high velocity will cause the solids particles to fragment and in the process will cause some of these fragmented pieces to enter inside that cylinder as well, thereby defeating the purpose of the filtering cylinder. The use of the ultrasonic waves appears to be an attempt at cracking the build-up of solids so as to allow it to flow out of the chamber with the incoming flow of slurry. The rotation of the filtering cylinder is not used as the primary source of the shearing action as in the case of the present invention. Effectively, Yuichi's cylinder may be rotating at very low speeds. Any attempt at shearing is introduced by the high pressure, high velocity injection nozzle. This is a substantially different approach than that taken by the present invention which uses a combination of vacuum and high shear rotating discs.

Tuit (3,262,577) discloses a "clamping" means for filter media. The present invention filter disc is composed of sintered metal or structured porous metal and ceramic powders. The present

invention does not use flexible media.

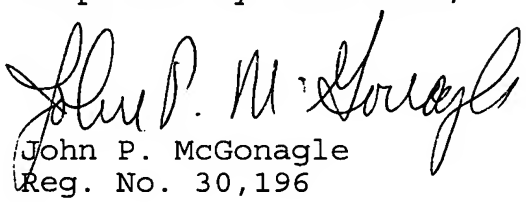
Okada basically uses the relative movement between discs to generate turbulence. This makes for a much more complicated mechanical design, resulting in a very expensive system. Okada uses pressure, not vacuum, as the driving force.

The other prior art are based on the same principles of operation, i.e., they try to push liquid through porous media by utilizing high pressures. The present invention uses vacuum to "draw" slurry through the filtering media. The prior art designs use pressure and, in some cases, high velocity feed to affect turbulence for preventing the build-up of product on the surface of the filtering medium. In doing so, the prior art risks the integrity and size of the particulates which creates more problems in that the finer the solids, the more difficult will be the separation. This will not occur with the present invention because the particulates are not slammed against any surface, thereby maintaining the large particle size and not fragmenting them.

Applicant believes that the Examiner will see from a reading of claims 6-13 that the distinguishing features of Applicant's invention are all present in the claims.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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